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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,798	01/29/2004	Neil G. Murray JR.	TRW(TE)6888	7228

26294 7590 10/19/2007

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EXAMINER	
VERBITSKY, GAIL KAPLAN	
ART UNIT	PAPER NUMBER
2855	
MAIL DATE	DELIVERY MODE
10/19/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/767,798	MURRAY ET AL.	
	Examiner	Art Unit	
	Gail Verbitsky	~~2859~~ 2855	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07/25/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,12-21 and 24-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,12-21 and 24-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/25/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4, 13-15, 20-21, 25-26, 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Messler (U.S. 20040114662/ 7268866) in view of Jaret et al. (U.S. 6177649) [hereinafter Jaret].

Messler discloses in Figs. 1, 4 a device/ method in the field of applicant's endeavor of positioning two plastic pieces 11 and 12 to abut each other in a weld and applying a laser beam 20 continuously (plurality of times) directed onto the pieces, the plastic piece 12 is absorbent to the laser radiation (therefore, can heat the weld). An inspection radiation device 30, 31, a camera 39 and a pyrometer 58 are used during welding (as the weld being formed) for testing of the welding process (para [0011]). The piece (second) 11 is transparent to the laser beam; therefore, the location of the abutment of two pieces is being heated by the laser beam 20. Messler also teaching to have a feedback to a welding apparatus (weld controller) in order to regulate the laser beam intensity/ modifying the heating if a signal (parameter/ temperature) is too high (outside desired or upper threshold or lower threshold). The device is used for obtaining a thermal data (predetermined wavelength corresponding to the IR) based on the thermal radiation 33 emanating from the weld and detected by the CCD 39 (and the

pyrometer 58) of the entire weld in order to determine (parameter/ quality, col. 6, line 6) the integrity/ quality of the weld (col. 5, lines 47-67, col. 6, lines 1-8). It is inherent, that having said image of the entire weld would ensure obtaining temperature at different points of the entire weld. The image(s) is analyzed in the evaluation unit. The pyrometer 58 is used to analyze the thermal radiation emitted by the weld, comparison with a reference, if the deviations are determined, the intensity (heat) of the laser is modified. Mirrors 23, 24 are moved to direct the laser onto the weld.

For claim 13: It is inherent, that the weld should be heated by the laser beam a plurality of time at a plurality of points in order to create a weld having a desired length.

For claim 15: It is inherent that the controller would compare the measured radiation with a threshold or desired radiation in order to determine if there is lack of quality (fails to meet the requirements), as very well known in the art.

For claim 29: the laser beam is reflected by a reflective device (mirrors).

Please note, since the weld is in between the layers, then, according to Fig. 5, the emanating radiating passing through the second layer 11 toward the CCD 39.

For claim 25: Please note, that the laser is constantly directed (plurality of times) onto the weld, and that the modifying of the heating by laser would also take place during that directing.

The method step will be met during the normal operation of the device stated above.

Although the CCD camera receives thermal radiation from the weld, Messler is not clear if the CCD is acting as a thermal camera providing a thermal image. Messler

does not explicitly teach that the thermal data provided by the pyrometer is thermal images.

Jaret discloses a device in the field of applicant's endeavor comprising a camera producing thermal images of the weld during welding.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device disclosed by Messler, so as to have a thermal camera (or replace the pyrometer with the thermal camera, or modify the CCD to enable it to produce thermal images), as taught by Jaret, in order to provide the operator not only with the visual data of the weld, but also with the image of thermal data of the weld, in order to allow the operator to take necessary actions, if one area is heated less than another.

3. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Messler and Jaret, as applied to claims 1-4, 13-15, 20-21, 25-26, 29-30 above, and further in view of Hashimoto.

Messler and Jaret disclose the device/ method as stated above.

They do not explicitly teach an alarm.

Hashimoto discloses in Fig. 1 a method/ device for monitoring quality of a weld comprising heating the weld and immediately (substantially simultaneously) acquiring a thermal distribution signal on another side of a second piece (col. 2, lines 25-33). The device also has a feedback control for analyzing the data and determining if the data meets an associated criterion, and modifying the heating/ cooling and providing a warning signal/ alarm.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add an alarm, disclosed by Messler and Jaret, so as to notify the operator about failure and to allow the operator to control defects, lack of integrity of the weld caused by improper welding process/ improper heating by controlling the weld temperature within predetermined (desired/ standard) limits.
The method step will be met during the normal operation of the device stated above.

4. Claims 7, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Messler and Jaret, as applied to claims 1-4, 13-15, 20-21, 25-26, 29-30 above, and further in view of Schepard(U.S. 200201724410).

Messler and Jaret disclose the device/ method as stated above.

They do not explicitly teach the limitations (determining width) of claims 7 and 18.

Schepard discloses a device in the field of applicant's endeavor, the device can be used to determine the size (thus, inherently, width) of the weld and the quality (presence of cracks, voids, defects, discontinuities) of the bond (col. 7, lines 1-2) and, inherently, compare them to the threshold (standard) by means of the histogram.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add a feature capable of determining the size of the weld, as taught by Schepard, so as to control the size of the weld, and thus the quality of the weld, because the proper weld size is very important in some miniature applications.
The method step will be met during the normal operation of the device stated above.

4. Claims 8, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Messler, Jaret and Schepard, as applied to claims 7, 18 above, and further in view of Traub.

Messler, Jaret and Schepard disclose the device/ method as stated above.

They do not explicitly the limitations of claims 8 and 19, i.e., determining that a parameter (width) is outside of the threshold.

Traub teaches a device / method in the field of applicant's endeavor wherein, in an automatic mode, a thermal signal (parameter) from a weld is compared to a signal recorded in memory (reference/ threshold), if the signal is higher or lower than the reference (does not meet an associated criterion), welding parameters are being adjusted by a (feedback) control circuitry (weld controller).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the controller of the device, disclosed by Messler, Jaret and Schepard, so as to have a feedback weld controller, as taught by Traub, in order to enable the device not only to detect failure but also to implement corrective functions.

The method step will be met during the normal operation of the device stated above.

6. Claims 24 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Messler and Jaret, as applied to claims 1-4, 13-15, 20-21, 25-26, 29-30 above, and further in view of Ish-Shalom et al. (U.S. 6299346) [Ish-Shalom].

Messler and Jaret disclose the device and method as stated above.

They do not teach the limitations of claims 24 and 28.

Ish-Shalom discloses a device wherein in order to obtaining a correct temperature (thermal data) of a test sample (wafer), an IR wavelengths from the heating lamps cut off (filtered).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device, disclosed by Messler and Jaret, so as to cut off the heating radiation from the final thermal data results, as taught by Ish-Shalom, in order to preserve the accuracy of the thermal data, as already suggested by Ish-Shalom.

The method steps will be met during the normal operation of the device stated above.

7. Claims 5-6, 16-17, 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Messler and Jaret, as applied to claims 1-4, 13-15, 20-21, 25-26, 29-30 above, and further in view of Shepard (U.S. 200201724410).

Messler and Jaret disclose the device and method as stated above.

They do not explicitly teach a plurality of images and determining time of taking an image.

Shepard teaches to obtain (plurality) thermal images over time and sample them over time in order to reconstruct the entire image. This would suggest that Schepard determines the time of taking the particular image. It is inherent, that Shepard would not take any images after the full image reconstructed, and there is no need to take more images.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device/ method disclosed by Messler and Jaret,

so as to take an image at a time, as taught by Schepard, in order to obtain a time temperature function which would allow the operator to determine heat conductivity/ diffusion of the weld and thus, it's quality, as very well known in the art.
The method step will be met during the normal operation of the device stated above.

8. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Messler and Jaret, as applied to claims 1-4, 13-15, 20-21, 25-26, 29-30 above, and further in view of Sandvoss.

Messler and Jaret disclose the device and method as stated above.

They do not explicitly teach the limitations of claim 27.

Sandvoss discloses a device/ method in the field of applicant's endeavor comprising heating a weld with a laser beam. The laser heat can be regulated by intensity, duration or speed of the moving laser beam (col. 3, lines 4-7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the IR thermal data means, disclosed by Messler and Jaret, so as to regulate heating by varying duration, intensity or the speed of the laser beam, as taught by Sandvoss, so as to provide the operator with an appropriate method of regulating of the heat, as very well known in the art.
The method step will be met during the normal operation of the device stated above.

Response to Arguments

9. Applicant's arguments with respect to claims 1-8, 12-21 and 24-36 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited in the PTO-892 and not mentioned above disclose related devices and methods.

Takeda et al. (U.S. 6462299) discloses the device and method in the field of applicant's endeavor comprising pieces 1a and 1b abutting each other for forming a weld (pool) and heating them with an induction heating apparatus 9 while the temperature is raised to a predetermined (annealing) temperature. This would imply, that the heating and temperature measurements (thermal image) are done simultaneously.

Geler et al. (U.S. 5474225) discloses the device and method in the field of applicant's endeavor. Geler monitors a just completed weld.

Jones (U.S. 4224499) discloses the device and method in the field of applicant's endeavor comprising a copper and an aluminum pieces butt-welded. The process involving heating and melting (pool formation) their interface. Jones does not teach to take IR images simultaneously with heating.

Juret et al. (U.S. 6177649) teaches to monitor a welding process by obtaining thermal images by using an IR camera in real time (simultaneously). Juret teaches to monitor the quality of weld and control the welding process. If a defect of the weld is noted (weld does not meet a required criteria), the weld head should be repaired (changing variables).

Shepard (U.S. 6585146) discloses in Fig. 1 a device/ method for monitoring quality of weld 106 being formed between first and second pieces (surfaces) 104a and 104b of a material 104. The method comprising the steps of heating the material 104 and the weld 106 with a heating source 102, collecting an infrared radiation (infrared wavelengths) passing through the material on the second surface (second piece) 104b, obtaining an image (plurality of images/ thermal data) by a camera 108, and analyzing the image by a computer 112. This would imply, that the camera captures the weld/ weld pool image in its entirely (thermal image/ temperature of each portion of the weld pool).

Chande et al. (U.S. 4817020) [hereinafter Chande] discloses in Fig. 3 a device/ method in the field of applicant's endeavor wherein a characteristic/ process parameter

corresponding to a quality of the weld is a cooling rate (col. 1, lines 12-30). Chande teaches to obtain a real-time thermal image/ simultaneously with directing/ heating by a laser beam (col. 6, lines 45-68, col. 14, line 68), analyzing the image and providing a feedback to a weld controller, such that modifying a cooling rate (thus heating) in response to a feedback signal. This would imply that the thermal image (temperature) is being somehow compared with an image standard/ predetermined or desired image or threshold. Chande states that other thermal imagers can be used (col. 14, line 68, col. 15, lines 1-3).

Dostoomian discloses the device and method in the field of applicant's endeavor comprising welding together two materials in a localized spot by providing a heating energy (by spot welders), and monitoring the spot (pool) for quality by obtaining an IR energy (thermal data) from the pool. This would imply that the device has a means for obtaining the thermal data. The device comprises a controller which adjusting the heating energy (magnitude of the weld current) by obtaining an IR energy/ temperature from the welding tips, while the IR energy provides a measure of the temperature (thermal data) of the weld (col. 3, lines 5-6). The controller has a differential circuit for generating an error signal and apply (feedback) it to the input of the spot welder (heater) throughout the course of the welding operation (heating) in response to the thermal data /temperature evaluation of the weld as compared to the standard thermal history stored in a memory and controlling (modifying) the welding current (heating) as required (in response to the feedback signal).

Any inquiry concerning this communication should be directed to the Examiner Verbitsky who can be reached at (571) 272-2253 Monday through Friday 8:00 to 4:00 ET.

GKV

Gail Verbitsky
Primary Patent Examiner, TC 2800

October 02, 2007